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(54) **WALKING STICK HANDLE STRUCTURE**

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A45B 3/04 (2006.01)
A45B 9/02 (2006.01)

(52) **U.S. Cl.**
CPC ***A45B 3/04*** (2013.01); ***A45B 9/02*** (2013.01)

(58) **Field of Classification Search**
None
See application file for complete search history.

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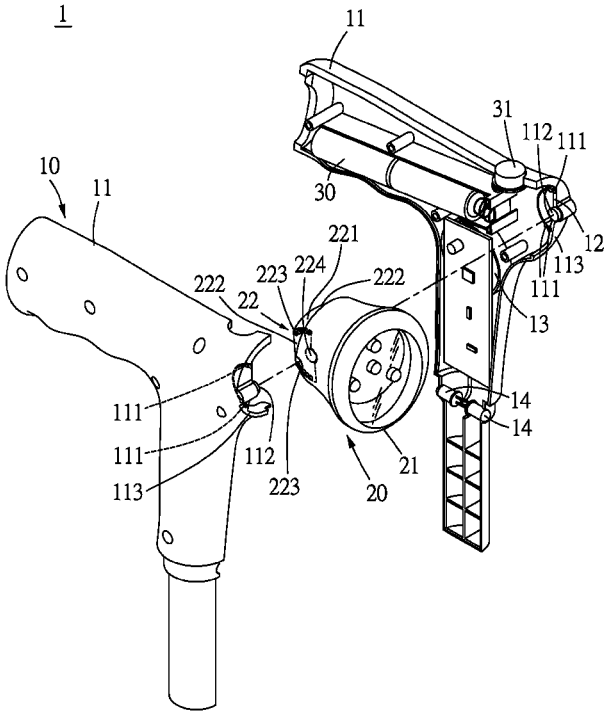
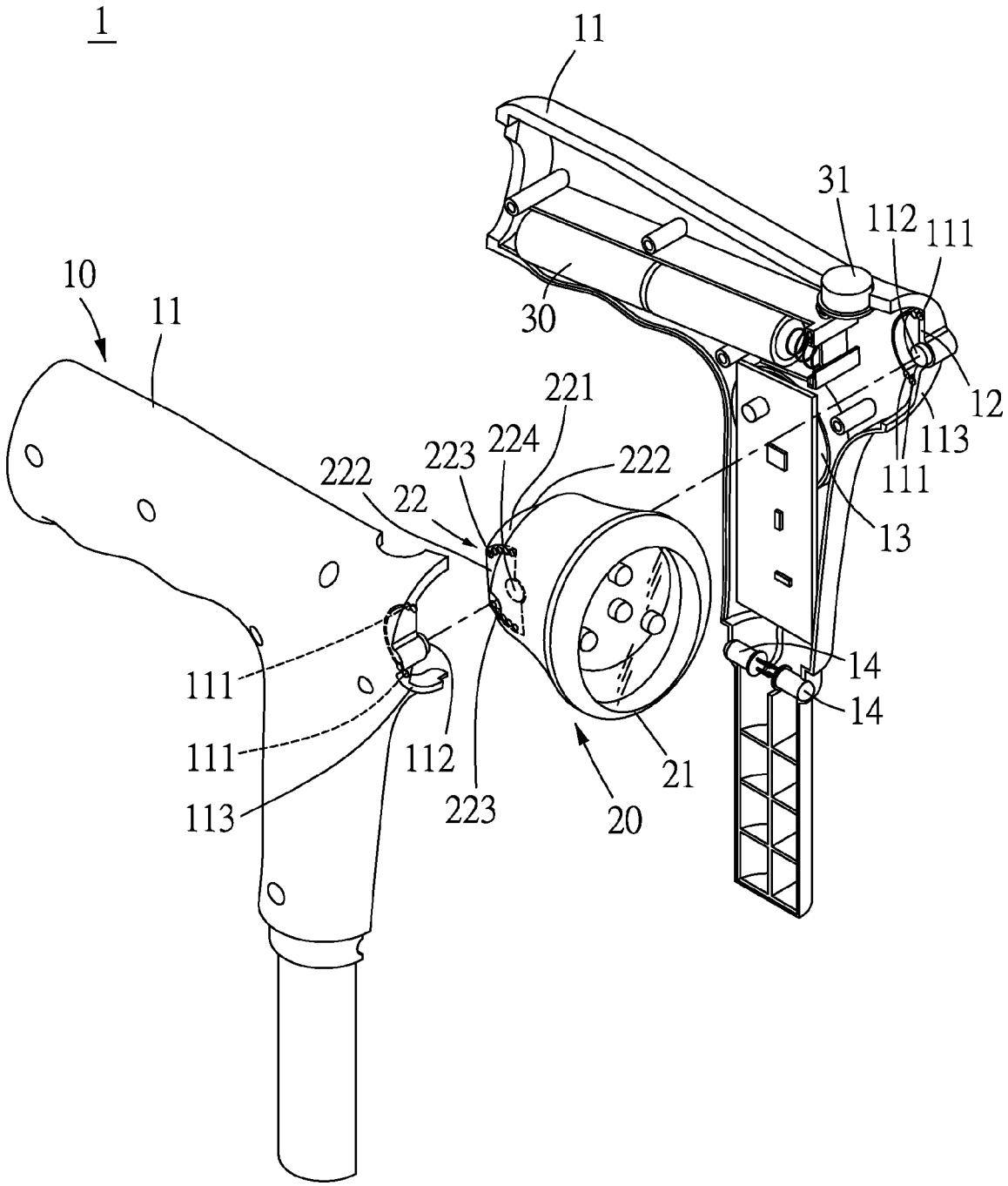
(57) **ABSTRACT**

A walking stick handle structure includes a handle body, a light-emitting module, and a power module. The handle body has two casings coupled together to form an opening. The casings each have an inner wall disposed thereon with a plurality of bumps corresponding in position to the opening. The light-emitting module has a first light-emitting portion and a connection portion. The connection portion is disposed in the opening and pivotally connected to the casings to enable the connection portion to rotate relative to the handle body. The connection portion has a curved surface and two lateral surfaces. The lateral surfaces each have recesses aligned in an arcuate pattern. The bumps are engaged with and fixed to the recesses, respectively, by an angle of rotation of the connection portion relative to the handle body. The power module is disposed in the handle body and electrically connected to the first light-emitting portion.

4 Claims, 6 Drawing Sheets

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113
223
20

FIG.1

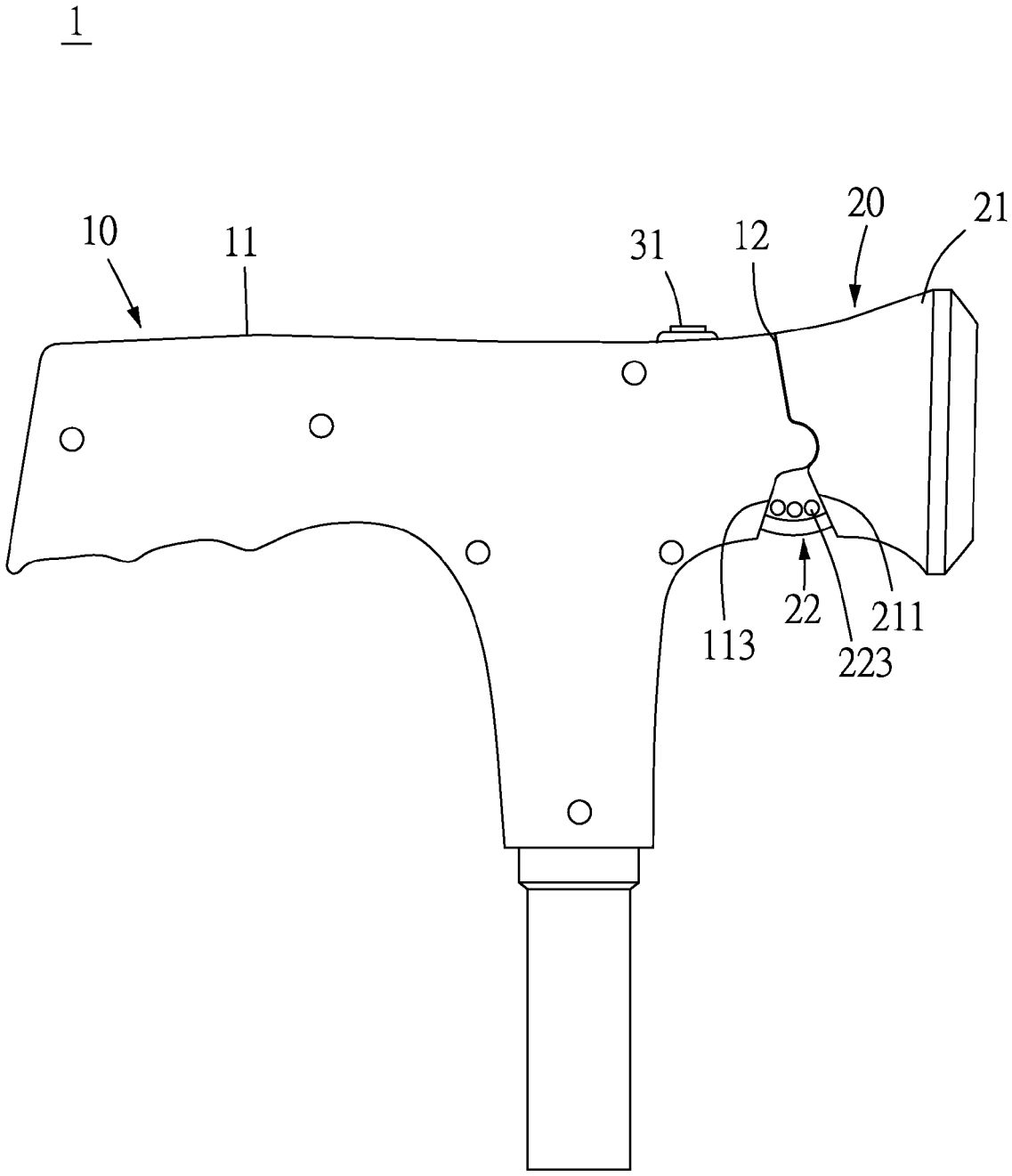
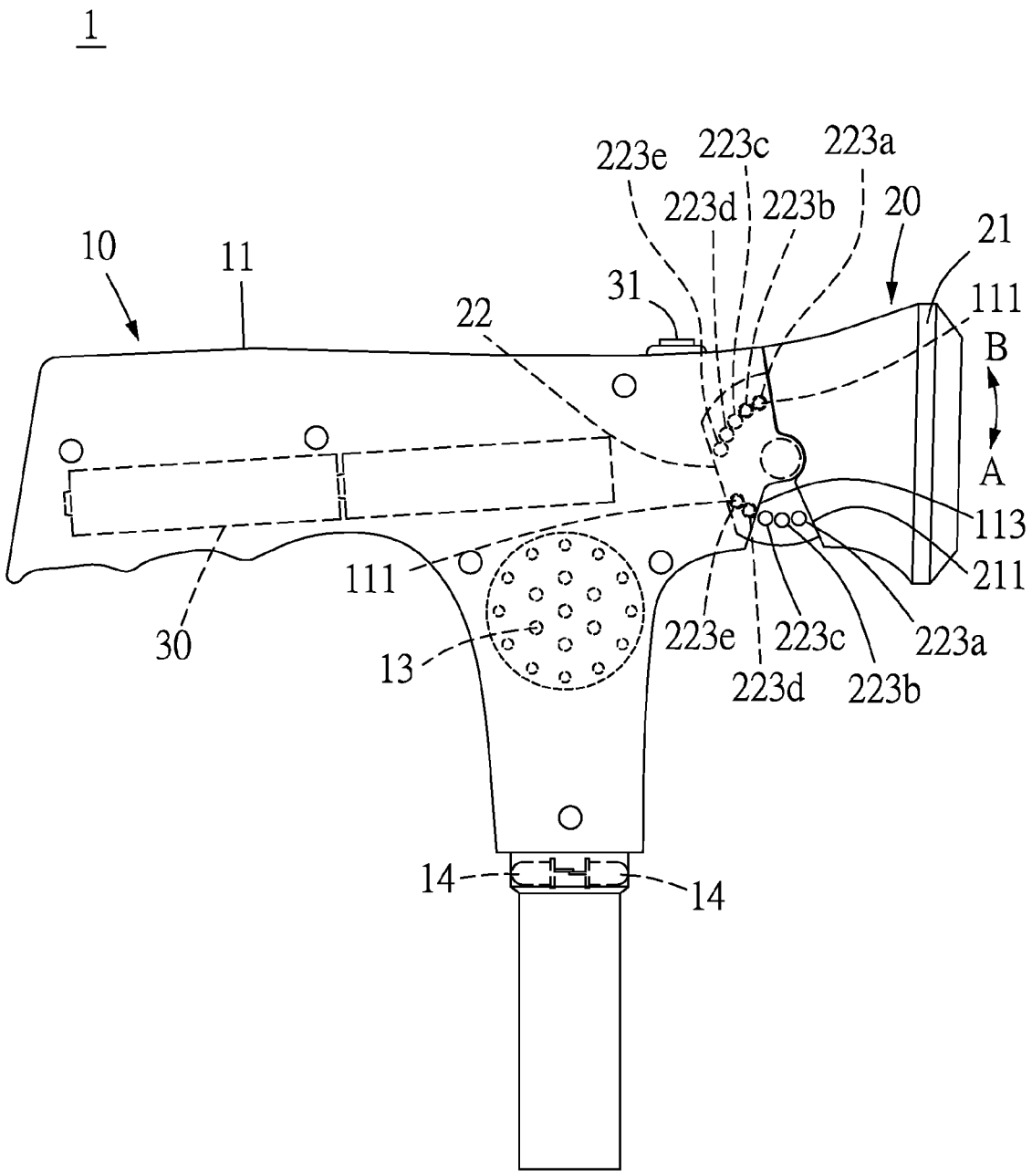


FIG.2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223e
223c
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10
11
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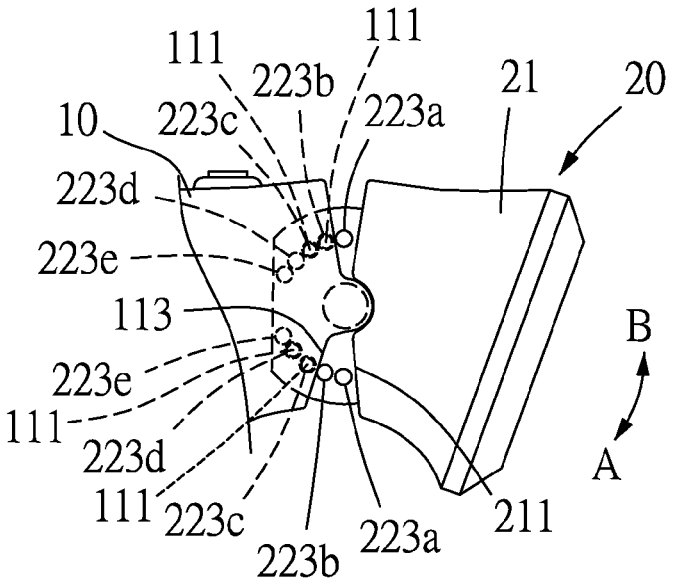
14
14

FIG.3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223a
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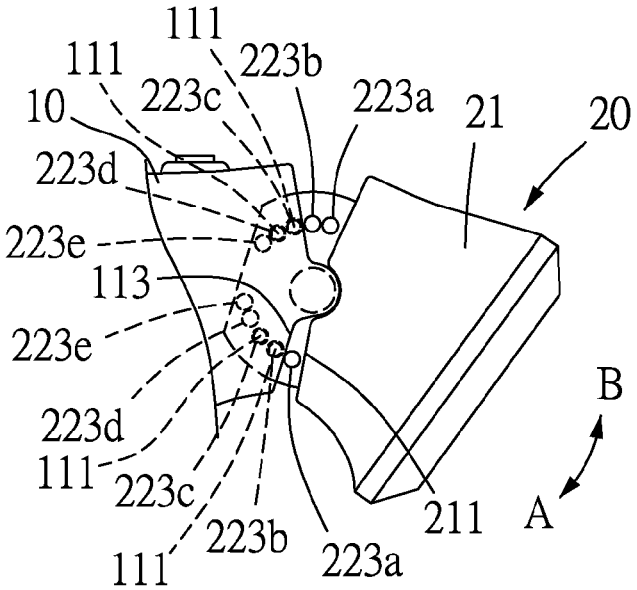
223a
211

FIG.4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223b
223c
223a
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223c
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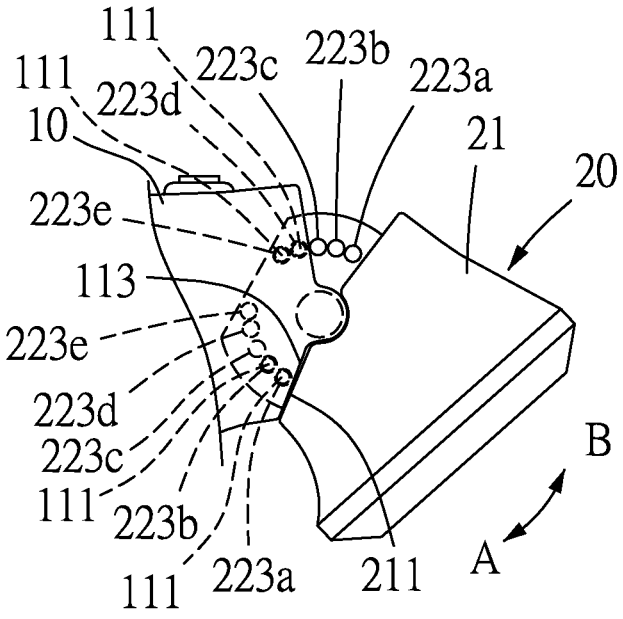
111
223b
223a
211

FIG.5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223b
223a
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223e
223d
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223a
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A

FIG.6

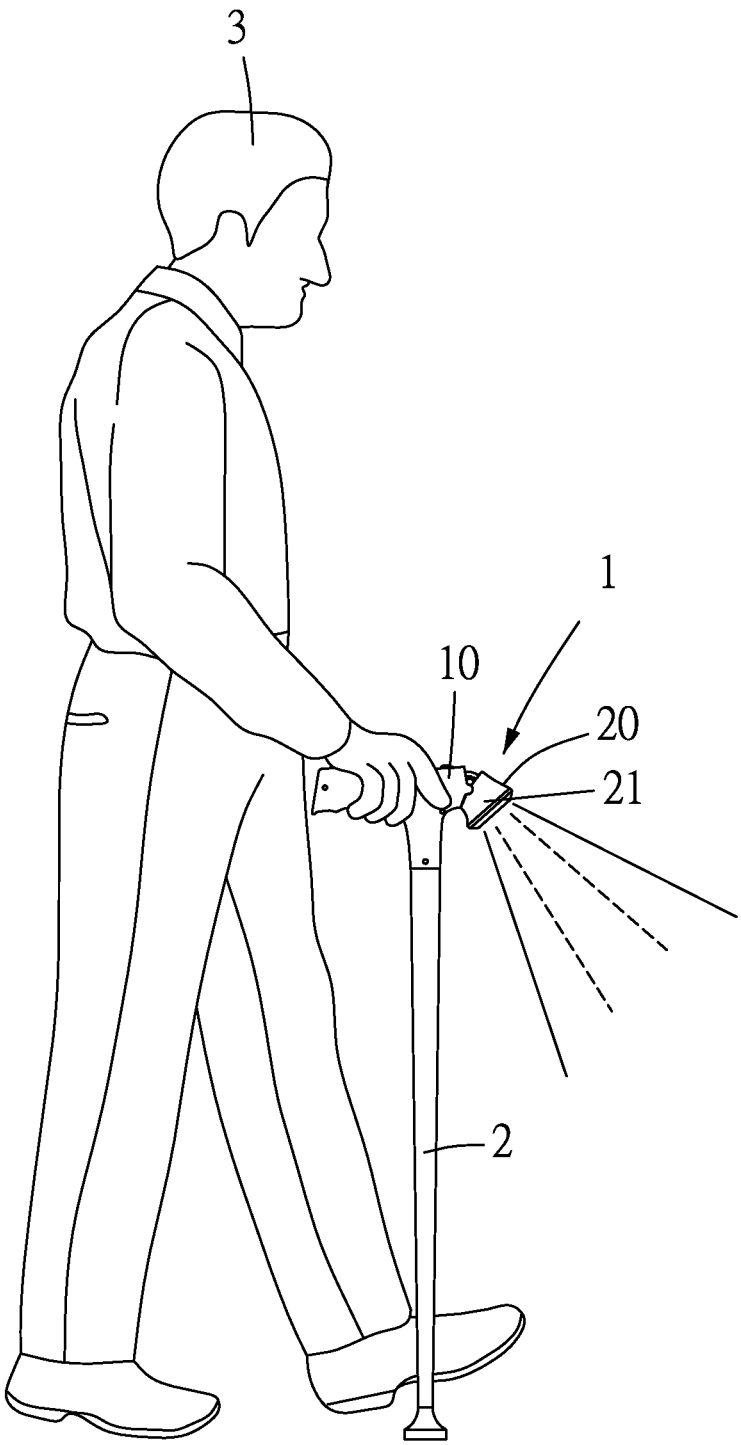

FIG.7

WALKING STICK HANDLE STRUCTURE

FIELD OF TECHNOLOGY

The present invention relates to walking stick handle structures, and more particularly, to a walking stick handle structure with a light-emitting module characterized by an adjustable illumination angle.

BACKGROUND

In general, walking sticks assist physically challenged persons and hikers in walking by bearing a portion of the body weight and thus reducing the burden of the lower limbs. To provide illumination in the dark or at an unilluminated corner, a light-emitting module is installed at the front end of a walking stick handle of a conventional walking stick and adapted to illuminate and ensure that the user can walk safely.

However, the light-emitting module of the conventional walking stick handle is fixed to the walking stick handle by a specific angle in a manner that a light ray emitted from the light-emitting module can only propagate forward. If the user wants to illuminate the ground immediately in front of her or him, s/he has to tilt the conventional walking stick by an angle in order for the light ray emitted from the light-emitting module to fall on the ground; however, in doing so, the conventional walking stick is functioning no more. To remedy the above drawback, the user illuminates the ground first and then restores the conventional walking stick to its vertical functioning position before starting to walk with the walking stick. Being incapable of continuous illumination, the conventional walking stick not only lacks ease of use but also fails to ensure user safety.

Accordingly, it is imperative to invent a walking stick handle structure which improves on the conventional walking stick in terms of illumination.

SUMMARY

It is an objective of the present invention to provide a walking stick handle structure capable of adjusting the direction in which a light ray emitted from a light-emitting module of the walking stick handle structure propagates.

In order to achieve the above and other objectives, the present invention provides a walking stick handle structure comprising a handle body, a light-emitting module, and a power module. The handle body comprises two casings coupled together to form an opening at an end of the handle body, the casings each having an inner wall disposed thereon with a plurality of bumps corresponding in position to the opening. The light-emitting module comprises a first light-emitting portion and a connection portion. The connection portion is disposed in the opening and pivotally connected to the casings to enable the connection portion to rotate relative to the handle body. The connection portion has a curved surface and two lateral surfaces. The lateral surfaces each have recesses aligned in an arcuate pattern. The bumps are engaged with and fixed to the recesses, respectively, by an angle of rotation of the connection portion relative to the handle body. The power module is disposed in the handle body and electrically connected to the first light-emitting portion.

As regards the walking stick handle structure, the recesses are disposed at upper and lower portions of each of the lateral surfaces, and the bumps are disposed at upper and lower portions of an inner wall of each of the casings in the opening.

As regards the walking stick handle structure, five said recesses are disposed at both the upper portion and the lower portion of each of the lateral surfaces, and two said bumps are disposed at both the upper portion and the lower portion of the inner wall of each of the casings in the opening and engaged with and fixed to any two adjacent ones of the recesses upon rotation of the connection portion relative to the handle body.

As regards the walking stick handle structure, each of the lateral surfaces of the connection portion has a round hole, and a post is disposed on the inner wall of each of the casings in the opening and inserted into the round hole.

As regards the walking stick handle structure, a first tilted surface is disposed at a junction of the first light-emitting portion and the connection portion and corresponds in position to a lower portion of each of the lateral surfaces.

As regards the walking stick handle structure, a second tilted surface is disposed at the opening and corresponds in position to a lower portion of the opening.

As regards the walking stick handle structure, the casings are equipped with a buzzer electrically connected to the power module.

As regards the walking stick handle structure, the casings are equipped with a second light-emitting portion electrically connected to the power module.

Accordingly, the present invention provides a walking stick handle structure characterized in that: a light-emitting module is pivotally coupled to a handle body by means of a connection portion; the light-emitting module can be rotated relative to the handle body; and recesses on the connection portion and bumps on the handle body are engaged with each other, respectively, to fix the angle of rotation of the light-emitting module relative to the handle body, so as to enable the user to adjust the direction in which a light ray emitted from the light-emitting module propagates and thus provide continuous illumination, thereby enhancing user safety.

BRIEF DESCRIPTION

Objectives, features, and advantages of the present invention are hereunder illustrated with specific embodiments in conjunction with the accompanying drawings, in which:

FIG. **1** is a schematic exploded view of a walking stick handle structure according to a specific embodiment of the present invention;

FIG. **2** is a schematic lateral view of the walking stick handle structure according to the specific embodiment of the present invention;

FIG. **3** is a schematic lateral view of the walking stick handle structure according to the specific embodiment of the present invention;

FIG. **4** is a schematic view of the walking stick handle structure according to the specific embodiment of the present invention;

FIG. **5** is a schematic view of the walking stick handle structure according to the specific embodiment of the present invention;

FIG. **6** is a schematic view of the walking stick handle structure according to the specific embodiment of the present invention; and

FIG. **7** is a schematic view of use of the walking stick handle structure according to the specific embodiment of the present invention.

DETAILED DESCRIPTION

Referring to FIG. **1** and FIG. **2**, there are shown a schematic exploded view and a schematic lateral view of a walking stick

handle structure **1** according to a specific embodiment of the present invention, respectively. As shown in the diagrams, the walking stick handle structure **1** comprises a handle body **10**, a light-emitting module **20**, and a power module **30**. The walking stick handle structure **1** is connected to a rod (not shown) from below to thereby form a walking stick.

The handle body **10** comprises two casings **11**. The casings **11** are coupled together and form an opening **12** at one end of the handle body **10**. A plurality of bumps **111** corresponding in position to the opening **12** is disposed on the inner wall of each of the casings **11**.

The light-emitting module **20** comprises a first light-emitting portion **21** and a connection portion **22**. The connection portion **22** is disposed in the opening **12** and pivotally connected to the casings **11** so as to be rotatable relative to the handle body **10**. The connection portion **22** has a curved surface **221** and two lateral surfaces **222**. The lateral surfaces **222** each have recesses **223** aligned in an arcuate pattern. The bumps **111** are engaged with the recesses **223** and fixed thereto, respectively, by the angle of rotation of the connection portion **22** relative to the handle body **10**. With the recesses **223** being inside the opening **12**, the bumps **111** engaged with and fixed to the recesses **223** are inside the opening **12** too.

The curved surface **221** of the connection portion **22** slides on the upper and lower portions of the inner rim of the opening **12**, as soon as the light-emitting module **20** rotates relative to the handle body **10** through the connection portion **22**.

The power module **30** is disposed in the handle body **10** and electrically connected to the first light-emitting portion **21**. The power module **30** houses at least one battery (such as rechargeable battery and non-rechargeable battery) to supply power to the first light-emitting portion **21**.

The first light-emitting portion **21** is equipped with a plurality of LED lamps. The power module **30** has a switch **31**. The switch **31** is exposed from the handle body **10** and adapted to turn on or turn off the LED lamps of the first light-emitting portion **21**, thereby providing illumination as needed.

The recesses **223** outnumber the bumps **111**. The first light-emitting portion **21** can emit a light ray in a variable direction, because the angle of rotation of the connection portion **22** relative to the handle body **10** is variable. In this embodiment of the present invention, the variation of the angle of rotation of the connection portion **22** relative to the handle body **10** is further maintained, because not only can the bumps **111** be engaged with and fixed to the recesses **223**, respectively, but the engaged pairs are variable by means of a reshuffle thereof.

In this embodiment, each of the lateral surfaces **222** of the connection portion **22** has a round hole **224**. A post **112** is disposed on the inner wall of each of the casings **11** in the opening **12**. The post **112** is inserted into the round hole **224** such that the connection portion **22** is rotatable about the post **112** to thereby change the direction of the light ray emitted from the first light-emitting portion **21**. The recesses **223** on each of the lateral surfaces **222** of the connection portion **22** are aligned in an arcuate pattern whose virtual center is located at the round hole **224** exactly. With the recesses **223** being aligned in an arcuate pattern (as mentioned earlier), and the recesses **223** being corresponding in position to the bumps **111**, respectively (as mentioned earlier), the bumps **111** are aligned in an arcuate pattern too.

To allow the light ray emitted from the light-emitting module **20** to propagate in a variable direction, for example, either forward or downward, while using the walking stick, the user rotates the light-emitting module **20** in a manner described below.

In this embodiment, the recesses **223** are positioned at upper and lower portions of each of the lateral surfaces **222**, whereas the bumps **111** are positioned at upper and lower portions of the inner wall of each of the casings **11**. The bumps **111** are engaged with and fixed to the recesses **223** positioned at upper and lower portions of each of the lateral surfaces **222** such that, upon an adjustment of the angle of rotation of the light-emitting module **20** to allow the light-emitting module **20** to be fixed at the handle body **10** by a new rotation angle, the light-emitting module **20** is prevented from rotating or sliding undesirably.

The way of varying the angle of rotation of the light-emitting module **20** relative to the handle body **10** can be varied, by increasing the quantity of the bumps **111** and the recesses **223** and/or changing the distance between the recesses **223**. For example, by keeping the quantity of the bumps **111** unchanged and increasing the quantity of the recesses **223**, it is possible to increase the maximum number of instances of varying the angle of rotation of the light-emitting module **20** relative to the handle body **10**. For example, by increasing the distance between the recesses **223**, it is possible to increase the change in the angle of rotation of the light-emitting module **20** relative to the handle body **10** in each instance of the variation of angle of rotation. Furthermore, a first tilted surface **211** is disposed at the junction of the first light-emitting portion **21** and the connection portion **22** and corresponds in position to the lower portion of each of the lateral surfaces **222**. A second tilted surface **113** is disposed at the opening **12** and corresponds in position to the lower portion of the opening **12**. Even if the external surface of the first light-emitting portion **21** of the light-emitting module **20** is flush with the external surface of the handle body **10**, the light-emitting module **20** can still rotate relative to the handle body **10**. Furthermore, the tilting angle of the first tilted surface **211** and the second tilted surface **113** corresponds in magnitude to the angle of rotation of the light-emitting module **20** relative to the handle body **10**.

In this embodiment, for an illustrative purpose, five said recesses **223***a*, **223***b*, **223***c*, **223***d*, **223***e* are disposed at both the upper portion and the lower portion of each of the lateral surfaces **222**, whereas two said bumps **111** are disposed at both the upper portion and the lower portion of the inner wall of each of the casings **11** in the opening **12**. Upon the rotation of the connection portion **22** relative to the handle body **10**, two said bumps **111** get engaged with and fixed to any two adjacent ones of the recesses **223***a*, **223***b*, **223***c*, **223***d*, **223***e*, such that the light ray emitted from the light-emitting module **20** can propagate in one of four different directions.

Referring to FIG. **3**, the light ray (not shown) emitted from the first light-emitting portion **21** propagates in a forward direction (hereinafter referred to as the "first irradiation angle aspect"). The upper portion of the first light-emitting portion **21** of the light-emitting module **20** is engaged with the handle body **10**. The lower portion of the first light-emitting portion **21** is spaced apart from the handle body **10** by a gap for exposing the three recesses **223***a*, **223***b*, **223***c* of the connection portion **22**; in other words, between the first tilted surface **211** and the second tilted surface **113** is an included angle whereby the recesses **223***a*, **223***b*, **223***c* are exposed. The two bumps **111** at the upper portion of the inner wall of each of the casings **11** are engaged with and fixed to the recesses **223***a*, **223***b* disposed at the upper portion of the connection portion **22** and positioned most proximate to the first light-emitting portion **21**. The two bumps **111** at the lower portion of the inner wall of each of the casings **11** are engaged with and fixed

to the recesses **223***e*, **223***d* disposed at the lower portion of the connection portion **22** and positioned most distal to the first light-emitting portion **21**.

Referring to FIG. **4**, the light-emitting module **20** previously shown in FIG. **3** is rotated toward a direction A so as to emit a light ray (not shown) in the second irradiation angle aspect; meanwhile, the upper portion of the first light-emitting portion **21** of the light-emitting module **20** is spaced apart from the handle body **10** by a gap for exposing the recess **223***a* on the connection portion **22**, whereas the lower portion of the first light-emitting portion **21** is spaced apart from the handle body **10** by a gap for exposing the two recesses **223***a*, **223***b* on the connection portion **22**, that is to say, between the first tilted surface **211** and the second tilted surface **113** is an included angle whereby the recesses **223***a*, **223***b* are exposed. The two bumps **111** disposed at the upper portion of the inner wall of each of the casings **11** are engaged with and fixed to the recesses **223***b*, **223***c* disposed at the upper portion of the connection portion **22**. The two bumps **111** disposed at the lower portion of the inner wall of each of the casings **11** are engaged with and fixed to the recesses **223***d*, **223***c* disposed at the lower portion of the connection portion **22**.

Referring to FIG. **5**, the light-emitting module **20** previously shown in FIG. **4** is rotated toward the direction A so as to emit a light ray (not shown) in the third irradiation angle aspect; meanwhile, the upper portion of the first light-emitting portion **21** of the light-emitting module **20** is spaced apart from the handle body **10** by a gap for exposing two recesses **223***a*, **223***b* on the connection portion **22**, whereas the lower portion of the first light-emitting portion **21** is spaced apart from the handle body **10** by a gap for exposing the recess **223***a* on the connection portion **22**, that is to say, between the first tilted surface **211** and the second tilted surface **113** is an included angle whereby the recess **223***a* is exposed. The two bumps **111** disposed at the upper portion of the inner wall of each of the casings **11** are engaged with and fixed to the recesses **223***c*, **223***d* on the connection portion **22**. The two bumps **111** disposed at the lower portion of the inner wall of each of the casings **11** are engaged with and fixed to the recesses **223***c*, **223***b* disposed at the lower portion of the connection portion **22**.

Referring to FIG. **6**, the light-emitting module **20** previously shown in FIG. **5** is rotated toward the direction A so as to emit a light ray (not shown) in the fourth irradiation angle aspect; meanwhile, the upper portion of the first light-emitting portion **21** of the light-emitting module **20** is spaced apart from the handle body **10** by a gap for exposing the three recesses **223***a*, **223***b*, **223***c* on the connection portion **22**, whereas the lower portion of the first light-emitting portion **21** is engaged with the handle body **10**, that is to say, the first tilted surface **211** and the second tilted surface **113** are engaged with each other. The two bumps **111** at the upper portion of the inner wall of each of the casings **11** are engaged with and fixed to the recesses **223***d*, **223***e* disposed at the upper portion of the connection portion **22** and positioned most distal to the first light-emitting portion **21**. The two bumps **111** at the lower portion of the inner wall of each of the casings **11** are engaged with and fixed to the recesses **223***b*, **223***a* disposed at the lower portion of the connection portion **22** and positioned most proximate to the first light-emitting portion **21**.

By contrast, if it is necessary for the first light-emitting portion **21** to emit a light ray (not shown) which propagates forward, the user can rotate the light-emitting module **20** toward a direction B to adjust the angle of rotation of the light-emitting module **20** relative to the handle body **10**.

In this embodiment, the casings **11** are equipped with a buzzer **13**. The buzzer **13** is electrically connected to the power module **30**, such that the power module **30** supplies power to the buzzer **13** to enable the buzzer **13** to not only buzz but also to be turned on or turned off by the switch **31** or another switch, and in consequence the user in need of rescue or assistance can turn on the buzzer **13** to generate an alert signal for attracting attention from other people.

In this embodiment, the casings **11** has a second light-emitting portion **14**. The second light-emitting portion **14** is electrically connected to the power module **30**, such that the power module **30** supplies power to the second light-emitting portion **14** to light up an LED lamp on the second light-emitting portion **14**. For an illustrative purpose, the second light-emitting portion **14** is disposed beneath the casings **11**, and the second light-emitting portion **14** is turned on or turned off by the switch **31** or another switch. An LED lamp of a color, say, red, different from that of the first light-emitting portion **21** is installed on the second light-emitting portion **14**. After being turned on, the second light-emitting portion **14** flashes to give an alert such that, in the dark, the other people notice the user, thereby preventing collision between the user and the other people.

Referring to FIG. **7**, there is shown a schematic view of use of the walking stick handle structure **1** according to the specific embodiment of the present invention. As shown in the diagram, the walking stick handle structure **1** is coupled to a rod **2** from below to form a walking stick, and the rod **2** is capable of extension and retraction. While a user **3** is walking with the walking stick in the dark or at an unilluminated corner, the user **3** grips the walking stick handle structure **1** such that the walking stick bears a portion of the body weight of the user **3**; meanwhile, to meet his or her need of continuous illumination, the user **3** rotates the light-emitting module **20** relative to the handle body **10** to adjust the direction in which the light ray emitted from the first light-emitting portion **21** propagates until the light ray falls on the ground immediately in front of the user **3**. At this point in time, the user **3** begins to walk and thus, during the walk, the ground immediately in front of the user **3** is continuously illuminated while the user **3** is walking with the walking stick, thereby enhancing user safety.

In conclusion, a walking stick handle structure of the present invention is characterized in that: a light-emitting module is pivotally coupled to a handle body by means of a connection portion; the light-emitting module can be rotated relative to the handle body; and recesses on the connection portion and bumps on the handle body are engaged with each other, respectively, to fix the angle of rotation of the light-emitting module relative to the handle body, so as to enable the user to adjust the direction in which a light ray emitted from the light-emitting module propagates and thus provide continuous illumination, thereby enhancing user safety.

The present invention is disclosed above by preferred embodiments. However, persons skilled in the art should understand that the preferred embodiments are illustrative of the present invention only, but should not be interpreted as restrictive of the scope of the present invention. Hence, all equivalent modifications and replacements made to the aforesaid embodiments should fall within the scope of the present invention. Accordingly, the legal protection for the present invention should be defined by the appended claims.

What is claimed is:

1. A walking stick handle structure, comprising:

a handle body comprising two casings coupled together to form an opening at an end of the handle body, the two

casings each having an inner wall disposed thereon with a plurality of bumps corresponding in position to the opening;

a light-emitting module comprising a first light-emitting portion and a connection portion, the connection portion being disposed in the opening and pivotally connected to the two casings to enable the connection portion to rotate relative to the handle body, the connection portion having a curved surface and two lateral surfaces, the two lateral surfaces each having recesses aligned in an arcuate pattern, and the plurality of bumps being engaged with and fixed to the recesses, respectively, by an angle of rotation of the connection portion relative to the handle body; and

a power module disposed in the handle body and electrically connected to the first light-emitting portion;

wherein five of the recesses are disposed at both an upper portion and a lower portion of each of the two lateral surfaces, and two of the plurality of bumps are disposed at both the upper portion and the lower portion of the inner wall of each of the two casings in the opening and engaged with and fixed to any two adjacent ones of the recesses upon rotation of the connection portion relative to the handle body,

wherein a first tilted surface is disposed at a junction of the first light-emitting portion and the connection portion and corresponds in position to a lower portion of each of the two lateral surfaces,

wherein a second tilted surface is disposed at the opening and corresponds in position to a lower portion of the opening.

2. The walking stick handle structure of claim **1**, wherein each of the lateral surfaces of the connection portion has a round hole, and a post is disposed on the inner wall of each of the casings in the opening and inserted into the round hole.

3. The walking stick handle structure of claim **1**, wherein the casings are equipped with a buzzer electrically connected to the power module.

4. The walking stick handle structure of claim **1**, wherein the casings are equipped with a second light-emitting portion electrically connected to the power module.

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